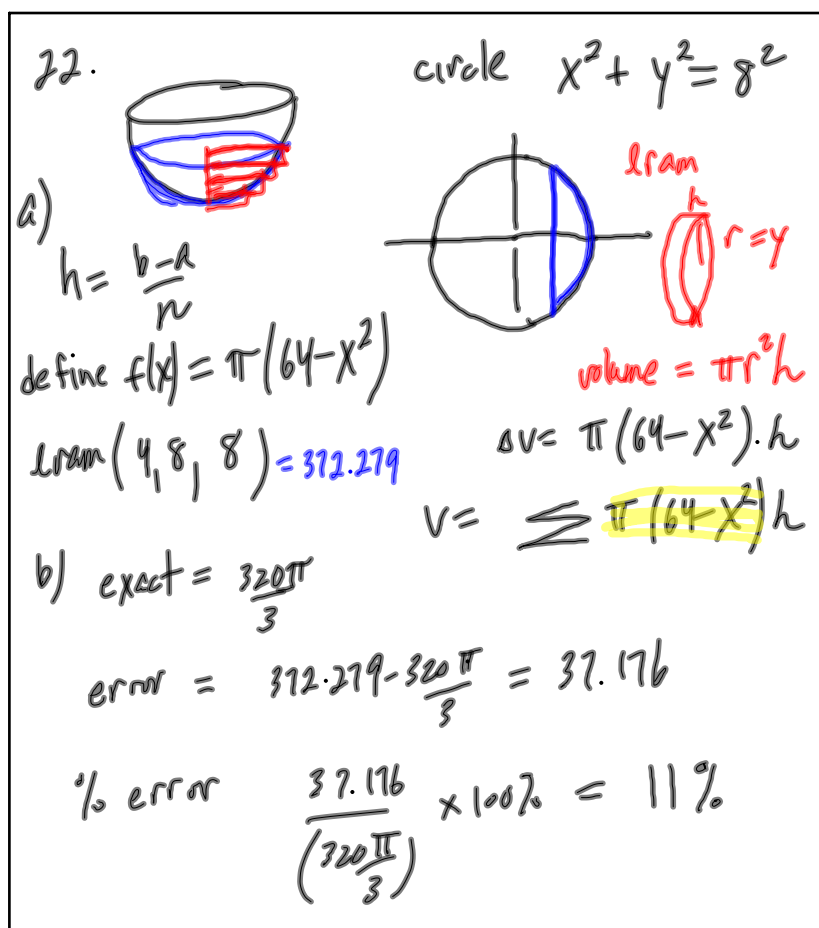
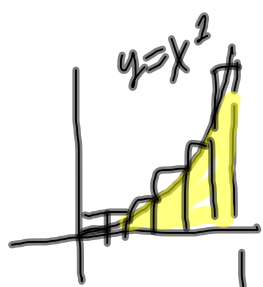


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5.2 exact area - definite integrals

find the exact area under $y=x^2$ on $[0,1]$ 

$$\lim_{\substack{n \rightarrow \infty \\ h \rightarrow 0}}$$

$$\sum_{i=1}^n$$

$$f(x_i)$$

height

width

Riemann sum
ram

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define $f(x) = x^2$

$$\text{ram}(0, 1, n) =$$

number of
rectangles

$$\frac{2n^2 - 3n + 1}{6n^2}$$

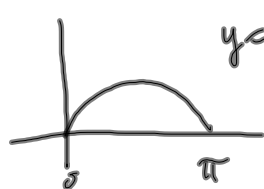
sum of areas
of rectangles -
(approx to
exact
area)

$$\lim_{n \rightarrow \infty} \frac{2n^2 - 3n + 1}{6n^2} = \frac{1}{3}$$

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definite integral (exact area)

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) h = \int_a^b f(x) dx$$



$$y = \sin x$$

$$\int_0^{\pi} \sin x \, dx = 2$$



$$\int_0^{2\pi} \sin x \, dx = 0$$

$$\int_{\pi}^{2\pi} \sin x \, dx = -2$$

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